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DRY PEA PRODUCTION IN ALBERTA

Introduction

Field peas were among the first crops cultivated by man. They are native to western Asia and have been a staple diet of man and livestock since prehistoric times. In many regions people still rely on peas to provide protein to complement the cereals in their diets. Dry peas range from 20 to 28 per cent crude protein.

World markets for vegetable protein are continually expanding. Dry peas have proven their worth in these markets because of their diversity and usefulness, resulting in a very optimistic future for production in Alberta.

Yields of pea seed in Alberta range from 2500 kg/ha to 5000 kg/ha depending on the climatic and soil zones where production takes place. Highest production is realized under irrigation and on Black soils where moisture is not a limiting factor. Production on dry, less fertile Dark Brown and Brown soils results in lower yields although requiring fewer days to maturity.

Adaptation/rotation

Dry peas are grown successfully in cool but not excessively cold climates. Seeds will germinate in cool (4 to 5°C) mellow soils. Poorly drained cold soils should be avoided as they favor the development of seedling diseases and root rots. Average growing season temperatures of 15° to 20°C produce optimum yields. Peas cannot tolerate hot weather or drought stress during the flowering period, as flowers will blast, resulting in loss of seed set. Temperatures above 27°C will tend to shorten the growing period and will adversely affect pollination. Pea plants can tolerate mild (-5° to -7°C) frost in the early vegetative stage, but frost at flowering may cause heavy pod losses, and frost at pod set may produce deformed and discolored seeds. Therefore, it is recommended that in Alberta peas be seeded as early in May as possible.

Evenly distributed and moderate amounts of rainfall are required to maximize dry pea production. In areas of low rainfall, the soil must have a deep profile and be capable of retaining moisture. The crop may be successfully irrigated.

In the Brown and Dark Brown soil zones yield-reducing drought stresses can be eliminated by growing peas under irrigation. Peas are most sensitive to drought during flower and pod formation. Peas are not high moisture users but moisture applied at the appropriate time can result in dramatic yield increases. On average, irrigated peas normally receive 254 mm (10 inches) of water during the growing season.

Peas have a shallow rooting zone of about 500 mm (2 feet). They are sensitive to soil salinity and to waterlogged soils. Growing peas under gravity irrigation systems may be difficult because they are sensitive to wet feet. Late irrigation must be closely monitored as it may induce severe sclerotinia and botrytis infections.

Under high temperature conditions, maximum economic yields are obtained when the soil-moisture content is kept at 60 per cent of field capacity from emergence to just prior to flowering, and at least 90 per cent of field capacity during flowering.

Dry peas may be grown on a wide range of well drained soil types. The crop grows best on loam, clay loam or sandy loam soils. Yields tend to be reduced when the crop is grown on sandy soils that do not retain moisture. Dry peas grow well on soils moderately well supplied with calcium, if the soils are neutral (7.0) or slightly acid (6 - 6.5).

Although peas are not considered a deep-rooted crop, they tend to be intolerant of a shallow profile or poorly drained soils, possibly because of the increased incidence of root diseases. Peas have a tap root system with numerous lateral secondary roots that extend 25 to 35 cm and are known to penetrate well into deep soils. The crop is not suited to eroded or compacted soils.

Peas should not be grown on the same field more than once in a four to five year rotation, nor any sooner than four years after an oilseed or other legume, because of the danger of an

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increase of soil borne diseases which are known to affect field peas. Peas are an excellent crop for extending existing crop rotations to four or five years. They also have the ability, when properly inoculated, to fix nitrogen for succeeding cereal crops and add valuable organic matter to all soils.

The growing season of peas usually varies between 80 and 110 days in Alberta. Growing seasons of 95 to 110 days are typical for the more indeterminate types and 80 to 95 days for the determinate or shorter growing types. Maturity may be delayed a few days in areas that receive excess moisture late in the growing season.

Rotational management, seedbed preparation and seeding

Management of the crop rotation before growing peas is of utmost importance for optimum production. Field peas are not good competitors with heavy weed populations. Weeds are easier and cheaper to control prior to a pea crop, therefore improved field cleanliness is recommended while growing cereal crops. Nitrogen fertilizer is not generally required in large amounts for optimum pea seed yields; nitrogen levels should be depleted the year before seeding peas. Residual levels of nitrogen of 10 to 20 pounds on Black soils, 20 to 25 pounds on Grey Wooded soils and 25 to 30 pounds on Brown soils prior to seeding peas are adequate for optimum yields.

Field peas are very sensitive to small amounts of certain herbicides which may be carried over in the soil from year to year. Fields treated with the commercial mixture of picloram and 2,4-D (Tordon 202C) or chlorsulfuron (Glean) should NOT be seeded to peas for three to five years. Soil pH and organic matter content will have some effect on the residual carryover of these herbicides. Refer to the *Guide to Crop Protection in Alberta* (Agdex 606-1) for further details.

Seedbed preparation and seeding are two very important aspects in field pea production. Early spring cultivation to seeding depth will warm and mellow the soil and promote rapid germination. In the Dark Brown and Brown soil zones minimize early spring cultivations so that this shallow depth does not dry out prematurely. Soils should be worked when enough moisture is present to reduce clods, but they should be dry enough to prevent compaction and crusting. Overworking results in a thick layer of pulverized soil that is susceptible to severe erosion and crusting. Well prepared seedbeds have a minimum of crop residue on the surface at seeding time. Early cultivation also encourages the first flush of weed growth which can be controlled prior to seeding.

Pea population densities of about 720,000 plants per hectare (72 plants per square metre or 12 plants per metre of row) are recommended for optimum yields in Alberta. Growers can use the same grain drills for dry peas that they use for cereal and oilseed crops. Hoe press drills are recommended over double disc drills because some seed will be left on the soil surface if the double disc drill is operated at high speeds. Drills should be calibrated for each variety of peas seeded because of variable seed sizes (table 1), and the seed cups should be adjusted for an even flow. If the seed is cracked or chipped germination will be impaired. Maintain constant ground speed for even seed distribution. Avoid shifting gears while moving uphill and downhill as much as possible to eliminate unseeded areas in the field. Air seeders are an alternative to ground driven drills; they plant seeds with precision regardless of slope or varying ground speeds, but uniform depth control may be a problem.

Plant pea seeds 5 to 7.5 cm deep in rows 15 to 18 cm apart as early in May as possible, provided the soil temperature at 2.5 cm below the surface is 5°C or above, and the soil is not excessively wet. Shallow seeding, 2.5 to 3 cm, should be avoided. Germination and emergence may be uneven owing to early drying of this shallow layer of soil. Early seeding advances maturity of the crop so that the probability of detrimental high temperatures during flowering is reduced. Early seeding also initiates earlier flower production on the more indeterminate types of peas (Century, Trapper, Tipu, etc.).

For optimum plant stands and yields, growers must use good quality seed with good germination

Table 1: Seeding Rates According To Seed Size

Variety	Seed wt. (g/1000)	Seeding Rate (kg/ha)
Trapper	150	135
Victoria	185	150
Tara	210	160
Tipu	230	175
Century	240	190
Express	240	190
Titan	265	200

(90 per cent or better). Poor quality seeds leach solutes (for example, sugars, amino acids and carboxylic acids) that promote pathogen growth and cause pre and post emergence damping off and various root rots. Poor quality seed can result from seed bleaching, weathering, aging, or from insects or diseases such as ascochyta blight.

Seed weights vary from year to year because of growing conditions. It is therefore advisable to get a 1000 kernel weight on every seed lot before seeding to ensure an optimum seeding rate. Also, properly calibrate the seed drill prior to seeding for every seed lot.

Seed inoculation and fertilizers

Peas must be inoculated with *Rhizobium leguminosarum* (Strain C), which is specific for peas, lentils and vetches, to ensure that the plants symbiotically fix a portion of their required nitrogen. Inoculation methods vary from farm to farm, but the procedure is not critical as long is it is convenient. The seed should be thoroughly coated with the peat–based inoculant that will adhere to the seed during seeding. Dry powder inoculant applications are ineffective because the material will not adhere to dry seed.

A sticking agent such as the commercial products Nitracoat or Nutrigum, gum arabic, wall paper paste that does not contain bacteriacides, or others such as solutions of powdered milk and sugar, are recommended for sticking the dry powder to the seed. Slurries of the sticking agents and inoculant are convenient for application as long as the slurry mixture is stirred frequently to keep the inoculant in suspension. Auger mounted fungicide applicators work well in applying the slurry to the seed, or one can manually apply the slurry mixture at the bottom of the auger as the seed is being moved into a truck or into the seed drill. Inoculated seed should be kept out of direct sunlight and should be planted within 48 hours. For further details on inoculants and methods of inoculation refer to *Inoculation of Legume Crops*, Agdex 100/23-1.

In cereal and oilseed producing regions, crop rotations may be developed that include legumes to supply at least part of the nitrogen needs of the cereals. In a well planned rotation, legumes are known to increase the nitrogen status of the soil when compared with cereal, oilseed or fallow rotations. In addition to the nitrogen supplied by symbiotic fixation, remaining requirements are met from either residual fertilizer applied to previous crops or from the breakdown of organic matter. In most cases in the Black soil zones, peas do respond to nitrogen application, but it causes reduced nodulation and nitrogen fixation and delayed crop maturity. Applied nitrogen in the Black soil zones also has a tendency to encourage greater weed growth in the crop. In the thin Black and Dark Brown soil zones and under irrigation, additional applied nitrogen may benefit the crop, especially through the dryer periods of plant growth. Peas, in this case, may respond to 20 to 40 pounds of applied nitrogen, but a soil test must be taken to determine optimum levels required.

Peas respond to phosphorus fertilization where soils are deficient in this element. In most instances, phosphorus is applied with the seed, however, excellent response is obtained by banding the phosphorus beside the seed. If banding equipment is not available, the rates of seed-placed phosphorus should not exceed 22 kg/ha. Adequate phosphorus levels in the soil promote root growth and nodulation.

Potassium and sulfur are also required for an optimum yield of peas. Many soils may be deficient, particularly Grey-Black and Grey soils. It is recommended that a soil test be taken to determine levels of fertilizer required. Inadequate levels of these nutrients will affect root nodulation and less nitrogen will be fixed.

Table 2: Field Pea Variety Characteristics

Variety	Relative yield %	Days to maturity	Seed Wt. (g/1000)	Vine length(cm)	Average crude protein %
Century	100	96-99	235	107	24
Trapper	97	96-99	150	100	25
Tara	114	97-100	210	105	23
Triumph	107	99-103	290	75	24
Tipu	97	95-98	230	109	23
Titan	110	98-101	265	112	24
Bellevue	115	100-105	180	90	23
Victoria	103	94	185	93	24
Fortune	115	102	185	75	24
Express	115	93	235	70	24

Varieties

Ten licensed Canadian dry pea varieties are adapted to Alberta. See table 2 for comparable statistics for each variety.

All varieties, except Triumph, are smooth round yellow-cotyledon cultivars; Triumph is a green type. All 10 varieties are eligible for the dry edible market provided grade specifications are met. The majority of peas marketed as dry peas will fall into No. 1 and 2 CW grades. Peas grading lower than No. 3 CW generally are marketed as livestock feed because of poorer color and more splits and cracks.

Century is used as the standard cultivar for dry edible peas. Century, a medium to large sized yellow, is preferred as the soup type pea.

Trapper, a smaller seeded cultivar, is popular among producers who feed their own livestock, because of its lower seeding rate and subsequent saving in seed cost.

Tara, a high yielding medium sized yellow, is also becoming a popular variety for feed pea production. Some of the seed of Tara may be somewhat flat sided and consequently not readily acceptable for the dry edible splitting industry.

Triumph, a large sized green type, is the only licensed green cotyledon cultivar in Canada. It requires a longer growing season than some of the yellow types and is susceptible to weathering and bleaching if not harvested soon after maturity. Crop desiccation is recommended when growing Triumph.

Tipu, Canada's first licensed semi-leafless cultivar, is well adapted to areas in Alberta with high rainfall and wet fall weather. Other advantages of Tipu include: a more uniform drydown at harvest, soils that dry faster after rain, easier direct combining and cleaner seed because the crop stays off the ground.

Titan, a large sized yellow type, has higher yields than Century but requires two to three days longer to maturity. The production area for Titan is important when considering this cultivar. Areas in the more fertile moist Black soil zones may not be suitable for optimum production. Titan may replace Century in some world markets that require large yellow peas.

Bellevue, a medium sized yellow type, is the latest maturing cultivar of all licensed varieties. It has a seed coat that is more durable than Trapper, and is more tolerant of mechanical damage. Make sure the growing season is favorable for Bellevue before a decision is made to grow this cultivar.

Victoria, *Express* and *Fortune* are private varieties from a Swedish pea breeding program. The Canadian distributor for the three varieties is Bonis and Co. Ltd. of Ontario. The varieties demonstrate a yield advantage over Century, grow on a shorter vine, and two varieties, Victoria and Express, have an advantage in fewer days to maturity.

Other Types

Vining (processing) peas

During the middle 1980s Alberta producers were introduced to peas from the pea processing industry. These types are becoming popular for producing livestock feed peas. They generally produce higher yields than the traditional licensed varieties and have a shorter growing season, 80 to 90 days. The varieties are not licensed in Canada and must be sold as common seed. They can only be marketed as a livestock feed product so should be contracted to a grain company or sold into a local feed market. Most of these peas originated from northern Europe, U.S.A., Australia and South Africa, and are wrinkled or sweet varieties.

Other processing peas from Europe and the U.S., such as the Alaska types, are also being grown in Alberta. They are smooth round green-cotyledon peas and can be marketed as dry edible peas. These types yield as well as the traditional types but mature 10 to 15 days earlier, at 80 to 90 days. They also include unlicensed varieties and seed must be sold as common seed. Contract marketing is recommended.

Miscellaneous combining peas

Varieties of these types are many and varied, some are being tested in Alberta and some are being grown commercially. The types include: maples, large greens or blues, marrowfats, etc. The varieties originated mainly from the U.S. and Europe and are unlicensed in Canada. They are grown for sale as dry peas and are marketed as bird food, livestock feed and dry edible peas. Producers interested in any of these types should investigate the agronomic characteristics of the cultivars before making a decision to grow them because of differences in agronomic requirements (days to maturity, seeding rates, etc.)

Agronomic testing for all these types continues in the province.

Weed control

Dry peas are not competitive with weeds, particularly at the time of crop emergence, therefore an effective weed control program is essential and often the most important consideration for profitable pea production.

Harrowing between seeding and crop emergence results in the control of new weed seedlings and the removal of weeds which have escaped previous operations. This tillage operation should be considered a standard practice in dry pea production. Harrowing should be avoided when emergence begins.

In most cases, chemical control of weeds will be

necessary during the growing season. Inadequate weed control may reduce seed yield by as much as 50 per cent owing to competition for moisture, light and mineral nutrients. A combination of herbicides is frequently required to provide the desired control of both grass and broadleaf weeds during the cropping season.

Precautions should always be taken to carefully read and follow the label recommendations for each herbicide, as these may differ from the more familiar applications in cereals and oilseeds.

Several herbicides which effectively control most of the common weed species are registered for use in pea crops. Broadleaf herbicides include products such as bentazon (Basagran), metribuzin (Sencor and Lexone), MCPA, MCPB (Tropotox), MCPB plus MCPA (Tropotox Plus) and trifluralin (Treflan, Rival andTriflurex). Grass herbicides include products such as barban (Carbyne), diclofop methyl (Hoe-Grass 284), sethoxydin (Poast), TCA, trillate (Avadex BW) and trifluralin (Treflan, Rival and Triflurex). For further details on the usage of these products, rates of chemical, rates of water, tank mixes, weeds controlled, etc., refer to Alberta Agriculture's *Guide to Crop Protection*, Agdex 606-1.

Insect pests

To date, insect damage has not been a problem in dry pea production areas of Alberta. A few insects could, at various times during the growing season, cause damage if populations were left unchecked.

Pea aphids have been known to infest pea fields in sufficient numbers to cause extensive damage. Aphids suck the sap from the plant causing foliar discoloration, stunting, leaf curl and damage to buds and flowers. Inspect for aphids during late May through June and early July. Consider control measures if aphids are present large populations and are causing the plants to wilt and look unthrifty. A number of insecticides are recommended for aphid control in peas. Consult the *Guide to Crop Protection in Alberta*, Agdex 606-1, for further details.

Grasshoppers feed on nearly all crops and large populations can cause severe damage to the foliage and pods of peas. Consider spraying if populations of eight or more grasshoppers per square metre are present in a pea field. A number of insecticides are registered for grasshopper control. Producers should investigate the availability and effectiveness of each when planning a control program.

Cutworms and wireworms occasionally cause damage in pea fields. Cutworm larvae destroy seedlings by cutting through them at or just below the soil surface, generally during late May and early June. If cultural control for the insect has been ineffective, chemical control should be considered and applied at dawn or dusk when the insect is actively feeding. Wireworm larvae, most frequently found in a field of grass breaking, damage germinating seed and young pea seedlings. Most damage is done in early spring while the larvae are close to the soil surface. Generally, seed treatment with an insecticide for two consecutive years after sod breaking will reduce populations to an uneconomic level.

If insects become a problem in field pea production, consult an Alberta Agriculture specialist.

Disease prevention

Dry peas are susceptible to numerous diseases in all pea producing areas of Alberta. Diseases can seriously reduce yield and quality of the crop. The diseases of importance are primarily soil borne or seed borne. To avoid serious disease build-up, sound management practices should be followed:

- Seed early – peas can and should be seeded early so that establishment and vigorous plant growth are achieved before climatic conditions initiate some of the diseases.
- Treat seed with the recommended fungicide, Thiram. Peas are susceptible to seedling diseases and seed rot because they are seeded early into cool soils. The fungicide treatment helps protect the seed and seedling against soil borne fungi.
- Plant pedigreed seed – ensure that the seed has been tested for ascochyta blight and has an incidence of less than 1 per cent of the disease.
- Practise proper rotational management – peas should not follow peas nor any other legume or oilseed. Use a cereal crop before and after peas to assist in breaking disease cycles.
- Practise proper preseeding cultivation management – soil compaction may lead to several different root rot diseases. Field pea roots, which may be infected with a root rot fungi, will have difficulty growing into lower soil depths where adequate moisture and nutrients are held if the soils have been compacted by farm machinery or are eroded hard pan soils.

Common diseases

Ascochyta blight - ascochyta diseases of peas are caused by three closely related fungi that produce distinct symptoms. Symptoms are characterized by spots on the leaves, stems and pods. These spots vary from brown to purple depending on which fungus is present. Seed-borne infection is probably the principal source, but the fungi can also overwinter in the soil on infected plant debris.

The severity of the disease can be reduced by using clean seed, locating new fields as far away as possible from previous years' fields, and not growing a pea crop in a field more frequently than once in every four or five years. Most accredited seed testing laboratories in the province offer an ascochyta test for pulse crops. Licensed varieties have some tolerance but are not resistant to the disease.

Seeding blight – the fungi which cause this disease are found in most cultivated soils. Infection, which is triggered by sugars and other nutrients released from germinating seeds, occurs within a few hours in wet soils. Damage is favored by heavy rain or irrigation shortly after the crop is seeded. Seedlings fail to emerge or become stunted and collapse before the first leaves unfold. Seeds rot rapidly and become encased in a white mold. Plants that escape seedling damage will, at times, develop a blight of the growing point or at a leaf axil several centimetres above ground level. The tissue becomes water soaked, turns brown or greenish purple, shrivels and rapidly dies. Control is obtained by treating the seed with the fungicide Thiram prior to seeding.

Root rot – several different soil-borne fungi cause root rot diseases in field peas. The disease complex can occur on the root or underground parts of the plant and sometimes extends a short distance above the soil surface. Roots and lower stems develop brown to black lesions, often beginning at the point of seed attachment, and the rotted tissue constricts and collapses.

The extent of yield reduction caused by root rot in peas is influenced by previous cropping history, soil temperature, soil moisture level and soil compaction. Eliminating soil-induced stresses by providing a well-prepared deep mellow soil at seeding will increase seedling vigor and the chance for the plant to grow through the period when it is susceptible to root rot.

Sclerotinia stem rot – sclerotinia is a fungus disease of major importance in crops such as canola, field beans, sunflowers and peas grown under irrigation. Generally it is only of minor importance in dryland peas but could become serious if peas are put in the rotation too close to the more susceptible crops. The disease infects plants as the sclerotia germinate and sporulate from the small cup shaped fruiting bodies. Moist weather favors infection. The fungus spores primarily infect the stem of the pea plant causing a soft rot, wilting and premature death of the plant. To date, no fungicide treatment in peas is registered; cultural methods in the form of proper rotations are recommended.

Botrytis – or grey mold as it is often called, may occur under high fertility conditions following a prolonged rainy period in July, or following the application of excessive amounts of irrigation water. High fertility conditions, in the absence of heat or drought stress, promote excess vegetative growth that lodges to form a dense mat. Prolonged rainy weather promotes rapid mold growth on the vines lying on the moist soil under this vegetative mat. Botrytis reproduces more easily than sclerotinia and can be a more explosive disease in the irrigated areas of Alberta. A four-year crop rotation between susceptible broadleaf crops is required for the control of botrytis. Fungicides are effective for control but research is required on application time and cost effectiveness.

Powdery mildew – this disease is also caused by a fungus. It infects plants when daytime temperatures are warm and evenings are cool enough to cause dew formation. White powdery areas appear on leaves, stems and pods, and may cover the entire plant. The best control for this fungus is to rotate crops and seed early since the disease is most serious on late maturing pea crops.

Bacterial blight – although the disease is not normally serious in Alberta, it can be a problem in wet seasons, particularly in fields damaged by hail. The bacteria survive overwinter within the seed or on the seed coat and in diseased vines. Control by using seed from inspected and clean seed lots, and rotate peas with nonlegumes to avoid reinfection from bacteria on debris.

For further information on field pea diseases refer to Alberta Agriculture's *Diseases of Pulse Crops*, Agdex 632-1.

Harvesting

Timely harvest of dry pea crops is essential for good quality seed and minimum seed losses. Premature harvesting does not allow seeds to fully mature within the pods. Yellow cotyledon cultivars, if harvested prematurely, may retain a small percentage of green color within the cotyledons. Harvesting too late, when the pods are dry and brittle, results in losses from shattering, broken seed and weather marked seed. Seed bleaching becomes a problem if green cotyledon cultivars are harvested when overripe.

Field peas can be swathed or straight combined. Swathing can begin when the majority of the vines and pods have turned to a yellow tan color. A small amount of green material remaining at the top of the plant will cure in the swath and the few remaining fully formed but immature seeds will dry without shrinking. When the field is swathed at this stage, consideration should be given to a light swath rolling as the crop will require a few days of warm weather for proper curing. In some cases swathing can be delayed until the crop is fully mature. If this type of operation is possible, the combine should follow immediately behind the swather. Shattering of dry, brittle pods can be minimized by harvesting at night or during the early morning when the

relative humidity is high. The swather should be equipped with vine lifters (pickup guards) and a pickup reel for maximum efficiency. Vine lifters spaced approximately 30 cm apart on the cutterbar and the pickup reel, with steel teeth, positioned above or slightly back from the leading edge of the cutterbar, will give most satisfactory results. Refer to Pami Research Report No. RO280, *Windrowing With A Floating Cutterbar*, for further details. Modifying the swather to provide a larger discharge opening may also be considered. A larger opening lays a wider, less dense swath that will dry and cure quicker. See Alberta Agriculture's publication *Bulky Swaths Improved With a Modified Swather*, Agdex 745-1, for further information. A narrow swather table should be considered if the swath of peas tends to be heavy and very dense. Lay an even uniform swath with no bunching or piling.

Field peas can also be straight combined. The crop should be left standing until full maturity is reached or it can be sprayed with a desiccant to speed dry. If a desiccant is used, it should be sprayed when all the pods are reaching full maturity, yellow to tan color. Most of the seeds of the yellow cotyledon types will be yellow with a few seeds in the top pods turning from green to yellow. The pods of the green cotyledon types will be yellow to tan in color and the seeds deep green to bluish green. A desiccant *will not* enhance maturity in an immature crop. Straight cut headers should also be equipped with vine lifters to facilitate cutting lodged material. Keep as much dirt as possible from entering the combine because it will permanently coat the seed and be classified as "ground tag" when the seed is graded.

When threshing the crop, adjust the machine's ground speed for an even input. Cylinder speeds should be adjusted between 350 and 600 rpm depending on the cylinder diameter and moisture content of the peas. The cylinder speed will also be adjusted according to the ease of threshing and the size and weight of the seed. Reduce cracking and splitting to a minimum. An initial concave setting should be approximately 1.5 cm in the front and 0.5 cm at the rear. Augers should be operated as full as possible and at reduced speeds to eliminate seed damage. Be careful not to plug augers by running too slow.

Peas containing green weed seeds should be cleaned or dried as soon as possible after combining. Peas can be combined at between 16 and 20 per cent moisture for ease of handling, and either air dried or dried with a grain drier for storage. Peas are considered safe for storage at 16 per cent moisture. If artificial heat is used for drying, air temperatures should not exceed 43°C for peas harvested for seed, or 71°C for peas harvested for commercial use.

Market opportunities

World exports of dry peas have increased significantly in recent years. Approximately 500,000 t, on an average, have been exported annually, with North America providing one half, and Canada one-quarter of these exports. Major importers have been Cuba, Trinidad, Venezuela, India and the United Kingdom. Canada is becoming more competitive with the U.S. and is gaining a larger share of the pea market. The challenge continues to remain competitive in the marketplace and to improve production programs. Strong marketing efforts are aided by growers diversifying to different types of peas for livestock feed, and improving their pea production management for all types. Some Alberta grain producers recognize that peas provide a profitable alternative crop.

Dry peas are widely used for human food and livestock feed. Only a small part of Canada's dry pea crop is used domestically for human food but the domestic market for livestock feed peas has grown in recent years in response to the demand for a domestically grown protein. Dry peas can be used in place of soymeal entirely in hog rations. To date, peas have been competitively priced in relation to barley and soymeal for this purpose. Tables 3,4 and 5 illustrate the figures that livestock and pea producers use in determining which feed offers the best value for the protein content. Domestic trading in livestock feed peas is expected to increase in the future. Consistent supplies must be provided to livestock feed processors to increase use and create a stable domestic market.

Most grain trading companies, as well as smaller private grain companies, are now involved in dry pea marketing. Peas are purchased for a number of purposes: human food, livestock feed, pet food and for seed. Pea producers are encouraged to use all avenues available to them while investigating a market for their peas. The Pulse Growers Association of Alberta is a good source of production and marketing information.

A Market Synopsis, which includes grain company contract arrangements and prices for most alternative crops, is prepared annually by the special crops specialist in Lethbridge. Alberta Agriculture has three special crops offices in the province, at Barrhead, Lethbridge and Lacombe, that offer a wide range of informational services. District agriculturists throughout the province also provide production and marketing information about dry peas.

Tabel 3: VALUE OF FIELD PEAS IN SWINE RATIONS*

Cost of Barley ($/TONNE)

Cost of soybean meal ($/tonne)	60	80	100	120
200	100	116	133	150
220	105	121	138	155
240	110	126	143	160
260	115	131	148	165
280	119	136	153	170
300	124	141	158	175
320	129	146	163	180

Peas - 21.0% protein
Barley - 11.5% protein
Soybean Meal - 46.0% protein

Table 4: VALUE OF FIELD PEAS IN SWINE RATIONS*

Cost of Barley ($/TONNE)

Cost of soybean meal ($/tonne)	60	80	100	120
200	112	126	140	155
220	118	133	147	162
240	125	140	154	168
260	132	146	161	175
280	139	153	168	182
300	146	160	175	189
320	153	167	181	196

Peas - 24.0% protein
Barley - 11.5% protein
Soybean Meal - 46.0% protein

Table 5: VALUE OF FIELD PEAS IN SWINE RATIONS*

Cost of Barley ($/TONNE)

Cost of soybean Meal ($/tonne)	60	80	100	120
200	123	136	148	160
220	132	144	156	168
240	141	153	165	177
260	150	162	174	188
280	158	170	182	195
300	167	179	191	203
320	176	188	200	212

Peas - 27.0% protein
Barley - 11.5% protein
Soybean Meal - 46.0% protein

* Numbers in boxed areas are pea prices per tonne

Conclusion

To produce optimal yields of peas with minimal input costs requires that the producer integrate of all the agronomic practices recommended in this publication. Omitting one or more of the practices can reduce yields and increase production costs.

Successful pea production begins with the selection of a specific variety adapted to the environment of the production area. Moisture, soil, weeds, insects and diseases as well as marketing, will influence the variety selected.

The field chosen is equally important for profitable pea production. Fields that are compacted or badly eroded, that waterlog during the growing season, or that are known to be heavily infested with weeds or diseases should not be planted to peas unless appropriate control measures are used.

Careful seedbed preparation and seeding practices will prevent many difficulties associated with pea production. Ensure that peas are produced under the most favorable conditions. Seed early; inoculate the seed with the proper inoculant; treat the seed with a fungicide; use good quality seed and avoid soil compaction. Harvest techniques for peas are different from those of traditional crops. At harvest plan to spend the management time that is required to get a quality product and optimum yield in the bin.

Proper timing of all production operations is crucial when growing peas. Plan ahead by developing production guidelines and a schedule of operations before the crop is seeded, and investigate all the information available for dry pea production.

METRIC CONVERSIONS

kg/ha ÷ 1.12	=	lb/ac
plants per hectare ÷ 2.47	=	plants per acre
tonnes per hectare ÷ 2.24	=	tons per acre
1 tonne	=	2204 lb

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